

**PLASMA IMMERSION ION IMPLANTATION APPARATUS
INCLUDING AN INDUCTIVELY COUPLED PLASMA SOURCE
HAVING LOW DISSOCIATION AND LOW MINIMUM PLASMA
VOLTAGE**

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ABSTRACT

A plasma immersion ion implantation reactor for
implanting a species into a workpiece includes an enclosure
10 having a side wall and a ceiling defining a chamber, and a
workpiece support pedestal within the chamber for supporting
a workpiece having a surface layer into which the species
are to be ion implanted, the workpiece support pedestal
facing an interior surface of the ceiling so as to define
15 therebetween a process region extending generally across the
diameter of the wafer support pedestal. The reactor further
comprises a source power applicator and an RF plasma source
generator coupled to the source power applicator for
inductively coupling RF source power into the chamber. A
20 gas distribution apparatus furnishes process gas into the
chamber, and a supply of process gas furnishes to the gas
distribution apparatus a process gas containing the species.
An RF bias generator is connected to the workpiece support
pedestal and has an RF bias frequency for establishing an RF
25 bias.